# Rumbles in the jungle

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THE outlook for Papua New Guinea's (PNG's) budding liquefied natural gas (LNG) industry remains exciting, even in a low price environment.

This year exploration and appraisal efforts are ramping up as a clutch of players aim to cement their LNG ambitions in the country, which holds 24 trillion cubic feet (cf) of natural gas reserves – two-thirds of which remains undeveloped – plus another 9.5 trillion cf of potential, data from energy research firm Wood Mackenzie shows.

ExxonMobil, Oil Search, InterOil and Horizon Oil have all recently offered timely reminders of their LNG aspirations, with 2015 shaping up to be a pivotal year.

"PNG is the best exploration story in Asia from what I can see and will work at low oil prices," Neil Beveridge, a Hong Kong-based oil and gas specialist at Wall Street research firm Bernstein, told *Petroleum Economist*.

The attraction for investors is large reserves upside, low costs and high liquids content in the gas, Beveridge said. As a result, PNG is the most competitive country for LNG expansion in the Asia-Pacific region. While the actual reserves figures to underpin LNG expansion remain unclear, they should be shored up by the end of 2015 or early 2016.

InterOil chief executive Michael Hession is not shy in stating he believes the US-listed company's proposed Elk-Antelope scheme, in the Eastern Province, has the potential to be the lowest-cost LNG project in Asia-Pacific.

The company, which is pursuing a two-train greenfield venture, estimates its proposed project could break even at less than $8 per million British thermal units (Btu), adding to PNG's charms.

## New operator

The partnership structure for Elk-Antelope LNG is finally starting to take shape.

At the end of February, French major Total became operator of PRL15, the licence hosting the multi-trillion cf Antelope find in the Eastern Papuan basin. With a credible LNG developer taking charge, and resolution of an arbitration dispute between InterOil and co-venturer Oil Search, the PRL15 partners are free to push ahead for development of the standalone scheme as soon as possible. A final investment decision is expected by 2017-18.

Elsewhere, Horizon Oil and Osaka Gas, which own undeveloped gas finds in PNG's Western Province, have started pre-feasibility studies for a greenfield mid-scale export plant capable of processing 2 million to 4 million tonnes per year on Daru Island.

But it was the successful start-up last year of the country's maiden LNG export project, the ExxonMobil-operated PNG LNG, that helped raise the nation's profile among investors, shareholders and financiers, demonstrating that major projects can be managed well in PNG, said Peter Botten, chief executive of Oil Search. Oil Search is PNG's biggest oil and gas company and has stakes in both the ExxonMobil and InterOil ventures.

ExxonMobil recently signed a memorandum of understanding with the government to use the P'nyang field as feedstock for an expansion of the PNG LNG project. A final investment decision for a third train, as well as debottlenecking, should be announced by the end of 2017, when the next PNG elections will take place, Matt Howell, a PNG-focused analyst at Wood Mackenzie, told *Petroleum Economist*.

But, while PNG LNG has the jump over the rest through its existing infrastructure, it does need to secure a little more gas in the Highlands to underpin the new train.

One or more appraisal wells will be drilled at P'nyang this year, and the company is drilling into the deep exploration section of the Hides F1 well, which is thought to have significant gas potential.

While the resource definition in the Highlands has been slower than expected, Beveridge is convinced it will come.

Meanwhile, the PRL15 partners need to bolster their gas resources. There is a lot of exploration and appraisal to be done at the Elk-Antelope field, considered by some as potentially the largest undeveloped gasfield in Asia. It's estimated to hold anywhere between 3.5 trillion and 11 trillion cf of gas. But more drilling needs to be done to prove up the resource.

Drilling results from Antelope-4 and Antelope-5 give scope for cautious optimism, said Beveridge.

But drilling in PNG is fraught with difficulties. A fire in a shallow-gas zone at Antelope-4 highlights the risk of a total blowout, Phil Mulacek, former chief executive of InterOil, told *Petroleum Economist*.

Mulacek, who is still a major shareholder in InterOil, recently raised concerns about the management of the drilling campaign. He said, aside from escalating costs, due to delays and technical problems, a blowout from Antelope – potentially one of the biggest gasfields in Asia – would "make the BP Gulf of Mexico fire look like a candle".

Still, the key for Beveridge was that both wells came in better than expected. Antelope-4 tagged the top reservoir and cut the downside risk towards the south of the structure, while "the operational issues are not something I worry about as they are being fixed", he said.

Antelope-5 came in 230 metres higher than InterOil predicted, which indicates the resource could be on the larger side of current estimates, Howell said.

The field owners – InterOil, Total and Oil Search – will test both the Antelope-4 and Antelope-5 wells in the second quarter, while Antelope-6 will be drilled in the third quarter and Antelope Deep before the end of the year. These wells will help define the size and structural extent of the field, and whether it can underpin one or two LNG trains. Bernstein estimates the partnership needs 7 trillion cf to support a two-train development. Oil Search puts current contingent resources (2C) at 5.3 trillion cf, while InterOil estimates them at 9.1 trillion cf.

Outside of PRL15, InterOil is planning to drill Triceratops-3, Wahoo-2 and a follow up well Raptor-2. If successful, this could lead to early monetisation and the potential for further LNG expansion.

In the Western Province, Talisman Energy has LNG plans as well. But its future remains uncertain given Repsol's ongoing $13 billion takeover of the Canadian company. The Spanish player's long-term commitment to the assets, which have perked Oil Search's interest, remains unclear. Repsol aims to wrap up its takeover of Talisman during the second quarter. But it will only have a clearer idea of its specific plans for the PNG business after the summer, a spokesperson told *Petroleum Economist*.

Talisman has its eyes on Daru Island, on the south coast, as its base case site for an LNG export plant – this was echoed recently by one of its co-venturers, Horizon Oil, an Australian-listed junior.

Other resource owners and co-venturers in the Western Province include Osaka Gas, Santos, Mitsubishi Corporation and Kina Petroleum. Talisman estimates there is gas potential of up to 20 trillion cf in the province, and aims to shore up between 3 trillion and 5 trillion cf by mid-2016.

Talisman's strategy revolves around the aggregation of smaller fields to create one larger reserve.

Even though Daru Island is the foundation concept, Horizon has said an alternative scenario could be a brownfield connection to the PNG LNG project if the proposed P'nyang field development goes ahead. The P'nyang field in the Highlands is 70 kms north of the Talisman-operated Stanley and Elevala-Ketu-Tingu fields in the Western Province. Daru Island, on the other hand, is at least 300 kms away from the proposed feedstock fields.

Low oil prices are putting downward pressure on gas prices, which makes collaboration between the various stakeholders more important, both to help cut costs and save time, Botten, who heads Oil Search, told *Petroleum Economist*.

Oil Search is the only company, along with the state, that straddles the boundaries of both the PNG LNG and Elk-Antelope ventures. And the Australia-listed company is encouraging the various participants, which include ExxonMobil, Total, Nippon Oil and Santos, to work together.

Collaboration could take the form of shared facilities, such as camps, jetties, storage tanks, as well as logistics support, even the more radical idea of sharing reserves, although the later is more difficult to achieve. But "in this environment we have to explore all the opportunities to get the best possible value out of the capital we spend", Botten added.

## Collaboration

Nevertheless, despite the significant incentives for cooperation, he warned it is not always possible to align the various stakeholders. Botten cited Gladstone, in the Australian state of Queensland, where three separate plants have been built simultaneously with each one suffering cost blow outs, as an example.

Grant Christie, Talisman's general manager for PNG and Australia, said recently that even though Daru is the preferred site for a greenfield LNG facility, "we think that a big part of the PNG story should be collaboration".

"It's probably in the last six to 12 months that I think people have started to realise what we realised about three or four years ago, which is aggregation is the way to accelerate the activity, share resources, have a common pipeline, and develop these resources collectively, as opposed to each consortium running in their own direction," he told local media.

"We are open to synergies with other gas owners. Our gas could fit with Elk-Antelope and with P'nyang."

Meanwhile, Total is more cautious. Jean-Marie Guillermou, Total's senior vice president Asia Pacific, said Total is enthusiastic about the idea of 'synergies' with third parties, but the circumstances must be right.

The Elk-Antelope gasfields lie much closer to the PNG LNG export plant than the remote Highlands fields that provide its feedstock. It is feasible that any proposed

**Figure 1: 6.9 million tonne per year PNG LNG project equity**

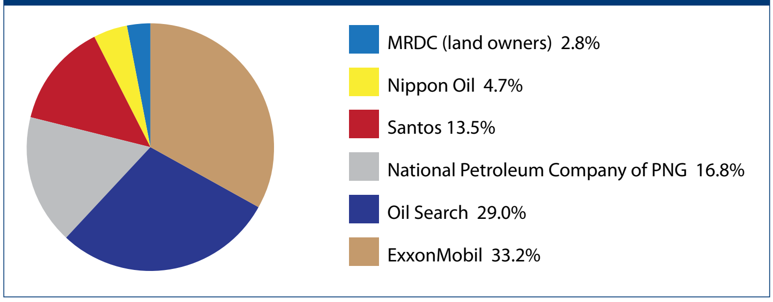
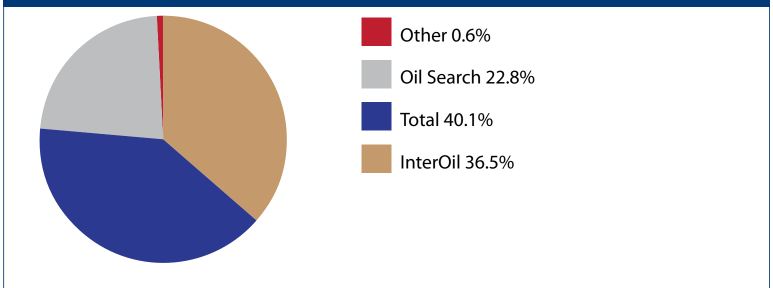



**Figure 2: 6.8 million tonne per year Elk-Antelope LNG project equity (pre-government farm-in)**




Elk-Antelope LNG development could share the export infrastructure already in place at the brownfield site in Port Moresby, making the development particularly attractive.

As a result, there could be at least $3 billion in savings relative to the $19 billion PNG LNG project analysis from Bernstein shows. At $16 billion, or around $2,000/tonne, Elk-Antelope would be one of the lowest-cost projects in the region. With a breakeven price delivered to Tokyo of $9 per million Btu, the ExxonMobil-led liquefaction scheme is already one of the most competitive globally.

The weaker oil price, which is cooling the price of service providers, should benefit any new projects or expansions.

Aside from collaboration, more consolidation could be on the cards too, largely because of oil price weakness, which hits the smaller players without access to the big bucks needed to support costly exploration. Drilling in PNG is not cheap given the unforgiving and technical nature of the terrain.

The cost of drilling a well in the more remote areas of PNG is comparable to the cost of drilling a deep-water well offshore Australia. Probes in the Highlands can cost upwards of $100 million, whereas in the Foreland and Western regions, wells cost typically half that amount, said Howell.

Until the entry of Total into the Elk-Antelope PRL15 venture at the end of 2013, the scene had been pretty stable since Oil Search snapped up BP and Chevron's assets more than 10 years ago. And given that the equity in PNG LNG and Elk-Antelope is tightly held and well regarded, it's hard to see there is any more to be had by major players, but PNG is still an attractive place to be, said Botten.

Oil Search, which has been operating in PNG for 86 years and is widely considered the local expert, is ready to pounce on any opportunities in its backyard, he added. ●